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Screening of different maize germplasm against *Chilo partellus* (Swinhoe) under artificial infestation

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Abstract
In order to study the screening of different maize genotypes, a series of field experiments were conducted during *Kharif* 2018 at the research farm, Tirhut College of Agriculture, Dholi, Muzaffarapur, (Bihar). Among the different maize genotypes screened against *Chilo partellus,* APH2, followed by BML (C), FQH-140 (15.89), APH1 (16.57) and QQPMH-41 were found least susceptible while the genotypes susceptible check, Pratap QPM Hybrid 1 (C) (39.81) followed by FQH-148 (38.25) found highly susceptible. The remaining genotypes tested showed intermediate position and were considered as moderately susceptible.

Keywords: Genotype, susceptible, *Chilo partellus*

Introduction
Maize (*Zea mays* L.) is considered as one of the most important cereal crops after rice and wheat, which plays a vital role in food economy of the world (Yonow *et al*., 2017) [7]. It is regarded as 'Queen of the cereals' having highest yield potential among them (IIMR, 2015) [3]. It is cultivated throughout the year in most of the Indian states for various purposes including grain, feed, fodder, green cobs, sweet corn, baby corn, popcorn, bio-fuel and industrial products etc. Maize, being a C4 plant, has a greater yield potential among the other cereals, maize yield poses several biotic and abiotic stresses, but attack of insect pests infesting this crop during various crop growth stages from sowing to maturity poses serious limitation in full manifestation of yield potential of maize during *Kharif* seasons in India. About 250 species of insects and mites species infesting maize crop and grain from field to storage, among them maize stem borer, *Chilo partellus* (Swinhoe) causes severe losses in field condition and reported 26.7-80.4% yield losses in different agro-climatic regions of India (Panwar, 2005) [5].
Stem borer *Chilo partellus* is the key pest of Kharif maize and most ubiquitous in nature causes severe damage to the various cereal crops from seedling to maturity during different developmental stages.
The female of *Chilo partellus* lays its scaly eggs mostly on the leaf blade of host plant. The early instar larvae of this pest firstly feed and mines on the leaves, leaf sheaths and other succulent plant parts and making shot holes. Thereafter, they bore inside the plant whorl and cut the growing tip of central shoot, producing dead heart (Kumar and Asino, 1993) [4]. The early instar larvae disperse by spinning threads and ballooning in the wind from the oviposition site (Berger, 1989). When larvae fully matured, pupation takes place inside the stem and remains inside until moth emergence. During the dry season, larvae enter into a state of suspended development for several months and pupate with onset of rains (Dhillon *et al*., 2017) [2].

Materials and Methods
An experimental trial was conducted at the research farm, Tirhut College of Agriculture, Dholi, Muzaffarapur (Bihar) during *Kharif* 2018 for screening of different QPM maize germplasm against maize stem borer.
For this purpose, twenty genotypes of quality protein maize including standard check under artificial infestation conditions were screened out for their degree of susceptibility to stem borer, *Chilo partellus*. Sowing of crop was done on 24th July 2018. All the germplasm were sown in two rows by using randomized block design and replicated thrice. Row lengths, row to row and plant to plant spacing were kept at 50 cm, 60 cm and 20 cm, respectively.

The tagged maize genotypes were closely examined at 20, 30 and 40 days after sowing. The data pertaining to per cent infestation, per cent cob infestation, mean number of exit holes, stem tunneling, height of the plant were recorded.
Cumulative mean per cent plant infestation was worked out based on these observations. Cumulative per cent pest infestation was calculated by using following formulae:

$$\text{Percent plant infestation} = \frac{\text{Number of infested plants/plot}}{\text{Total number of plants/plot}} \times 100$$

The rating of individual plant of each plot was done 20, 30, and 40 days after sowing on the basis of 1-9 scale by following the procedure of Sarup *et al*. (1979) [6].

Results and Discussion

During the experiment the damage parameters *viz*., per cent plant infestation, and dead hearts were recorded during vegetative stage. The data pertaining on per cent cob damage was recorded at full maturity of cobs. Whereas, the damage parameters *viz*., exit holes and tunnel length and yield were recorded after harvesting. The overall mean of per cent plant infestation of all the observations on maize genotype ranged from 14.84 to 39.81. There were significant differences in plant infestation between the genotype. The genotype, APH2 recorded lowest plant infestation (14.84) followed by BML (C) (15.85), FQH-140 (15.89), APH1 (16.57) and QQPMH-41 (17.36) which were on par with each other. The per cent plant infestation was significantly high in susceptible check, Pratap QPM Hybrid 1 (C) (39.81) followed by FQH-148 (38.25). The remaining genotypes tested showed intermediate position and were considered as moderately susceptible. The results indicated that, there were significant differences among the maize genotypes with respect to per cent cob damage by stem borers, ranging from 6.30 to 18.2 per cent. The lowest tassel damage per cent was recorded in APH2 (6.30). The number of exit holes per plant varied significantly among the maize genotypes. The data indicated that, the exit holes for all the genotypes ranged from 4.20 to 12.70. The least number of exit holes were recorded in BML (C) (4.20) followed by APH2 (4.40), FQH-140 (4.70), APH1 (5.00) and QQPMH-41 (7.1) which were on par with each other. The tunnel length observed in all the genotype ranged from 2.90 to 16.4 cm per plant. The shortest tunnel length was recorded in BML (C) (2.90) followed
APH2 (3.00), FQH-140 (3.20), APH1 (3.40) and QQPMH-41 (3.70). Plant height ranged from 109 to 189 cm. The maximum plant height was recorded in decreasing order of length APH2 (189 cm), QQPMH (185 cm), FQH-140 (183 cm), QQMMH-41 (182 cm) and APH1 (180 cm).

Table 1: Per cent cob infestation, mean stem tunnel length, number of exit holes and height of different maize genotypes due to *Chilo partellus* (Swinhoe) under artificial infestation condition during *Kharif* 2018

Genotypes	LIR	Per cent cob infestation	Mean number of exit holes	Mean Stem tunnel (cm)	Height (cm)
FQH-148	6.2	16.8 *(24.19)[ab]	12.7 **(3.57)[a]	16.4[a]	123
APH2	2.7	6.3 (14.50)[i]	4.4 (2.08)[g]	3[i]	189
IQPMH-18-1	4.7	11.5 (19.81)[efg]	7.8 (2.78)[f]	7.3[f]	170
IQPMH-18-2	4.7	11.1 (19.45)[efgh]	7.7 (2.77)[f]	7.2[fg]	170
APQH1(QPM+PRO-A)	4.3	9.9 (18.00)[gh]	7.2 (2.67)[f]	5.7[gh]	158
APH1	2.9	7.3 (15.62)[i]	5 (2.23)[g]	3.4[i]	180
APH27(PRO-A)	4.9	13.8 (21.80)[cd]	8.5 (2.91)[def]	9.7[e]	178
IQPMH-18-4	4.6	10.7 (17.59)[efgh]	7.4 (2.72)[f]	6.8[fgh]	161
FQH-140	2.8	6.8 (15.10)[i]	4.7 (2.16)[g]	3.2[i]	183
APQH5(QPM+PRO-A)	4.5	10.4 (18.78)[fgh]	7.6 (2.75)[f]	6.8[fgh]	166
IQPMH-18-3	4.8	12.8 (20.94)[de]	8.1 (2.84)[ef]	8.3[ef]	177
BML 6 (C)	2.7	6.4 (14.61)[i]	4.2 (2.03)[g]	2.9[i]	156
IQPMH-18-5	5.8	18.2 (25.21)[a]	11.2 (3.34)[abc]	13.4[b]	109
QQPMH-41	2.9	7.1 (15.42)[i]	5.3 (2.29)[g]	3.7[i]	185
QQPMH-14153	4.7	11.8 (20.08)[def]	7.8 (2.78)[f]	7.7[f]	174
KDQH-55(CAH1824)	5.4	15.3 (23.01)[bc]	9.8 (3.13)[cde]	11.3[d]	180
Vivek hybrid 27 (C)	5.4	15.7 (23.34)[abc]	10.2 (3.19)[bcd]	11.7[cd]	166
Pratap QPM Hybrid 1 (C)	6.2	17.6 (24.80)[ab]	12.3 (3.51)[ab]	15.8[a]	149
QPMMH-41	5.7	16.2 (23.73)[abc]	11 (3.31)[abc]	13.1[bc]	182
EHQ-640	4.1	9.4 (17.82)[h]	7.10 (2.66)[fg]	5.4[h]	157
S.Em(±)		(0.68)	(0.09)	0.51	6.36
CD (0.05)		(1.94)	(0.34)	1.53	18.27

LIR – Leaf injury rating
*Figures in parentheses are the values of arc sine transformation
**Figures in parentheses are the values of square root transformation

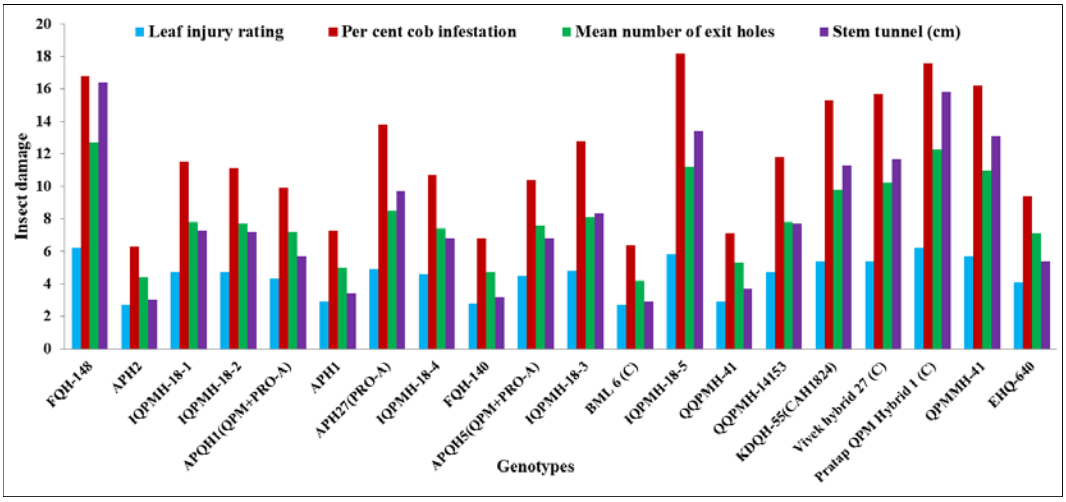

Fig 1: Per cent cob infestation, mean stem tunnel length, number of exit holes and height of different maize genotypes due to *Chilo partellus* (Swinhoe) under artificial infestation condition during *Kharif*2018

Conclusion

Among the different maize genotypes screened against *Chilo partellus*, APH2, followed by BML (C), FQH-140 (15.89), APH1 (16.57) and QQPMH-41 were found least susceptible while the genotypes susceptible check, Pratap QPM Hybrid 1 (C) (39.81) followed by FQH-148 (38.25). The remaining genotypes tested showed intermediate position and were considered as moderately susceptible.

Reference

1. Berger A. Ballooning activity of *Chilo partellus* larvae in relation to size of mother, egg batches, eggs and larvae and age of mother. *Entomologia Experimentalis et Applicata*. 1989;50:125-132.
2. Dhillon MK, Hasan F, Tanwar AK, Bhadauriya AS. Effects of thermophotoperiod on induction and termination of hibernation in *Chilo partellus* (Swinhoe). Bulletin of Entomological Research, 2017;107(3):294-302.
3. IIMR. Annual Report. Indian Institute of Maize Research (IIMR), Pusa Campus, New Delhi; c2015.
4. Kumar H, Asino G. Resistance of maize to (Lepidoptera: Pyralidae): effect of plant phenology. Journal of Economic Entomology. 1993;86:969-73.
5. Panwar VPS. Management of maize stalk borer, *Chilo partellus*. In Stresses on Maize in Tropics. Zaidi, P.H. and Singh, N.N. (eds.), Directorate of Maize Research, New Delhi, India; c2005. p. 324-375.
6. Sarup P, Marrwaha KK, Panwar VPS, Siddiqui KH. Studies on insect plant relationship evaluation of introduction on nursery for resistance to the maize stalk borer, *Chilo partellus* (Swinhoe) under artificial infestation. Journal of Entomological Research. 1979;1(2):151-157.
7. Yonow T, Kriticos DJ, Ota N, Van den Berg J, Hutchison WD. The potential global distribution of *Chilo partellus*, including consideration of irrigation and cropping patterns. Journal of Pest Science. 2017;90:459-477.